

AMENDMENTS TO THE CLAIMS:

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of Claims:

1. (Currently Amended) An impedance measurement system for measuring skin impedance in a small skin region, comprising:

an electrode unit having a plurality of current supply electrodes for supplying a constant current and a plurality of measurement electrodes separate from the current supply electrodes for measuring a response signal of skin; and

a current source for supplying the constant current to the current supply electrodes;

~~a signal processing unit, which is connected to the measurement electrodes, for receiving response signals generated in the skin in response to the applied constant current, for generating a potential difference signal, for removing noise from the potential difference signal, and for amplifying the noise removed potential difference signal;~~

~~a signal conversion unit for converting the potential difference signal received from the signal processing unit from an analog format into a digital format; and~~

~~an image display unit for converting the digital potential difference signal into an image signal and for displaying the image signal.~~

2. (Currently Amended-Withdrawn) The impedance measurement system as claimed in claim ~~[[1]]~~ 53, wherein the current supply electrodes comprise a first electrode ~~having a cylindrical structure~~ and a second electrode ~~having a cylindrical structure~~ surrounding and concentric with the first electrode, and

wherein the measurement electrodes include third and fourth electrodes disposed between the first and second electrodes, the third and fourth electrodes ~~having a cylindrical structure~~ surrounding and concentric with the first electrode.

3. (Currently Amended) The impedance measurement system as claimed in claim ~~[[1]]~~ 56, wherein ~~each of the current supply electrodes comprises:~~

~~a~~ ~~the~~ first electrode has ~~having~~ a first side, a second side perpendicular to the first side, and a third side perpendicular to the second side and facing the first side; and

[[a]] the second electrode has ~~having~~ a same shape as the first electrode, the second electrode being disposed separate from the first electrode such that an opening side of the second electrode faces an opening side of the first electrode;

~~wherein the measurement electrodes are disposed in an inner space defined between the first and second electrodes.~~

4. (Currently Amended) The impedance measurement system as claimed in claim [[3]] 56, wherein the measurement electrodes are disposed perpendicular to the first and second electrodes.

5. (Currently Amended) The impedance measurement system as claimed in claim [[1]] 59, wherein ~~each of the measurement electrodes comprises:~~

a the third electrode has ~~having~~ a first side, a second side perpendicular to the first side, and a third side perpendicular to the second side and facing the first side; and

[[a]] the fourth electrode has ~~having~~ a same shape as the third electrode, the fourth electrode being disposed separate from the third electrode such that an opening side of the fourth electrode faces an opening side of the third electrode;

~~wherein the third and fourth electrodes are disposed between the plurality of current supply electrodes.~~

6. (Currently Amended) The impedance measurement system as claimed in claim [[5]] 59, wherein the third and fourth electrodes are disposed perpendicular to the plurality of current supply electrodes.

7. (Currently Amended-Withdrawn) The impedance measurement system as claimed in claim [[1]] 56, wherein ~~each of the current supply electrodes comprises:~~

a the first electrode has ~~having~~ an oval structure with an opening portion and a predetermined curvature; and

[[a]] the second electrode has having a same shape as the first electrode, the second electrode being disposed separate from the first electrode such that an opening of the second electrode faces an opening of the first electrode;

~~wherein the measurement electrodes are disposed in an inner space defined between the first and second electrodes.~~

8. (Currently Amended) The impedance measurement system as claimed in claim [[7]] 55, wherein the third and fourth electrodes are disposed perpendicular to the plurality of current supply electrodes.

9. (Currently Amended - Withdrawn) The impedance measurement system as claimed in claim [[1]] 59, wherein ~~each of the measurement electrodes comprises:~~

~~a~~ the third electrode has having an oval structure with an opening portion and a predetermined curvature; and

a fourth electrode has having a same shape as the third electrode, the fourth electrode being disposed separate from the third electrode such that an opening of the fourth electrode faces an opening of the third electrode;

~~wherein the third and fourth electrodes are disposed between the plurality of current supply electrodes.~~

10. (Currently Amended) The impedance measurement system as claimed in claim [[9]] 58, wherein the third and fourth electrodes are disposed perpendicular to the plurality of current supply electrodes.

11. (Currently Amended - Withdrawn) The impedance measurement system as claimed in claim [[1]] 54, wherein the current supply electrodes and the measurement electrodes have a linear shape flat structure, ~~the measurement electrodes have a flat structure~~, and the current supply electrodes and the measurement electrodes are disposed parallel to each other, ~~and the measurement electrodes are disposed between the current supply electrodes.~~

12. (Currently Amended) The impedance measurement system as claimed in claim [[3]] 1, wherein the electrode unit further comprises:

a first electrode distance adjuster for adjusting a distance between the current supply electrodes including:

a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and

~~a second electrode distance adjuster for adjusting a distance between the measurement electrodes including:~~

~~the second electrode distance adjuster includes a second stationary screw line connected to the measurement electrodes, a second rotary screw joined to the second stationary screw line and rotating the second stationary screw line to move the measurement electrodes along the second stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the second stationary screw line, wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.~~

13. (Currently Amended) The impedance measurement system as claimed in claim [[5]] 12, wherein the electrode unit further comprises:

~~a first electrode distance adjuster for adjusting a distance between the current supply electrodes including:~~

~~a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and~~

a second electrode distance adjuster for adjusting a distance between the measurement electrodes including:

~~the second electrode distance adjuster includes~~ a second stationary screw line connected to the measurement electrodes, a second rotary screw joined to the second stationary screw line and rotating the second stationary screw line to move the measurement electrodes along the second stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the second stationary screw line, wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.

14. (Currently Amended) The impedance measurement system as claimed in claim [[7]] 1, wherein the electrode unit further comprises:

~~a first electrode distance adjuster for adjusting a distance between the current supply electrodes including:~~

~~a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and~~

~~a second~~ an electrode distance adjuster for adjusting a distance between the measurement electrodes including:

~~the second electrode distance adjuster includes~~ a ~~second~~ stationary screw line connected to the measurement electrodes, a ~~second~~ rotary screw joined to the ~~second~~ stationary screw line and rotating the ~~second~~ stationary screw line to move the measurement electrodes along the ~~second~~ stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the ~~second~~ stationary screw line; wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.

15. (Currently Amended) The impedance measurement system as claimed in claim[[9]] 1, wherein the electrode unit further comprises[[:]]

~~a first an~~ electrode distance adjuster for adjusting at least one of a distance between the current supply electrodes including:

~~a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and~~

~~a second electrode distance adjuster for adjusting and a distance between the measurement electrodes including:~~

~~the second electrode distance adjuster includes a second stationary screw line connected to the measurement electrodes, a second rotary screw joined to the second stationary screw line and rotating the second stationary screw line to move the measurement electrodes along the second stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the second stationary screw line, wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.~~

16. (Currently Amended) The impedance measurement system as claimed in claim [[11]] 15, wherein the ~~electrode unit~~ electrode distance adjuster further comprises:

a stationary screw line connected to the current supply electrodes and the measurement electrodes;

a rotary screw, which is joined to the stationary screw line, for rotating the stationary screw line to move the current supply electrodes and the measurement electrodes along the stationary screw line; and

a fixing stud for fixing each of the current supply electrodes and the measurement electrodes to the stationary screw line.

17. (Original) The impedance measurement system as claimed in claim 1, wherein the current source comprises:

an input unit for dividing a voltage received from an external power supply unit into predetermined voltages and for outputting the predetermined voltages;

a current converter for converting each of the predetermined voltages into a constant current regardless of a load;

a current intensity controller for adjusting an intensity of the constant current output from the current converter using variable resistance; and

an output unit for applying the current received from the current converter to the electrode unit.

18. (Canceled).

19. (Currently Amended) The impedance measurement system as claimed in claim [[1]] 60, wherein the signal processing unit comprises:

a buffer for maintaining an input impedance higher than a skin resistance and for temporarily storing the response signals;

a potential difference measurer for measuring a potential difference between the measurement electrodes using the response signals and for outputting a potential difference signal;

an offset voltage controller for performing a zero (0) adjustment for the impedance measurement system and for adjusting a direct current (DC) level of the potential difference signal received from the potential difference measurer to shift a measuring range;

an amplifier for amplifying the potential difference signal output from the offset voltage controller up to a predetermined level;

a filter for removing noise from the amplified potential difference signal; and

a phase inverter amplifier for amplifying the noise-filtered potential difference signal and for inverting a phase of the potential difference signal.

20.-23. (Canceled).

24. (Currently Amended) The impedance measurement system as claimed in claim 1, further comprising an wherein the image display unit including comprises:

a data analyzer for performing a predetermined operation on the potential difference signal received from the signal conversion unit and for outputting analyzed data;

an operation controller for determining an operation to be performed by the data analyzer; and

a display unit for converting the analyzed data into an image signal and for outputting the image signal.

25. – 27. (Canceled).

28. (Currently Amended) An impedance measurement electrode used to measure skin impedance in a small skin region, comprising:

a plurality of current supply electrodes for supplying a constant current to skin; and

a plurality of measurement electrodes, which are separated from the current supply electrodes, for measuring a response signal of the skin;

~~wherein the measuring electrodes are disposed between the current supply electrodes.~~

29. (Original) The impedance measurement electrode as claimed in claim 28, wherein the measurement electrodes have a thickness of about 0.8 mm.

30. (Currently Amended- Withdrawn) The impedance measurement electrode as claimed in claim ~~[[28]]~~ 61, wherein the current supply electrodes comprise a first electrode ~~having a cylindrical structure~~ and a second electrode ~~having a cylindrical structure~~ surrounding and concentric with the first electrode, and

wherein the measurement electrodes include third and fourth electrodes disposed between the first and second electrodes, the third and fourth electrodes ~~having a cylindrical structure~~ surrounding and concentric with the first electrode.

31. (Currently Amended) The impedance measurement electrode as claimed in claim ~~[[28]]~~ 64, ~~each of the current supply electrodes comprises:~~

a ~~the~~ first electrode ~~has having~~ a first side, a second side perpendicular to the first side, and a third side perpendicular to the second side and facing the first side; and

~~[[a]]~~ ~~the~~ second electrode ~~has having~~ a same shape as the first electrode, the second electrode being disposed separate from the first electrode such that an opening of the second electrode faces an opening of the first electrode;

~~wherein the measurement electrodes are disposed in an inner space defined between the first and second electrodes.~~

32. (Currently Amended) The impedance measurement electrode as claimed in claim ~~[[31]]~~ 64, wherein the measurement electrodes are disposed perpendicular to the first and second electrodes.

33. (Currently Amended) The impedance measurement electrode as claimed in claim ~~[[28]]~~ 67, wherein ~~each of the measurement electrodes comprises:~~

a ~~the~~ third electrode ~~has having~~ a first side, a second side perpendicular to the first side, and a third side perpendicular to the second side and facing the first side; and

~~[[a]]~~ ~~the~~ fourth electrode ~~has having~~ a same shape as the third electrode, the fourth electrode being disposed separate from the third electrode such that an opening side of the fourth electrode faces an opening side of the third electrode;

~~wherein the third and fourth electrodes are disposed between the plurality of current supply electrodes.~~

34. (Currently Amended) The impedance measurement electrode as claimed in claim ~~[[33]]~~ 67, wherein the third and fourth electrodes are disposed perpendicular to the plurality of current supply electrodes.

35. (Currently Amended- Withdrawn) The impedance measurement electrode as claimed in claim ~~[[28]]~~ 64, wherein ~~each of the current supply electrodes comprises:~~

a the first electrode has ~~having~~ an oval structure with an opening portion and a predetermined curvature; and

[[a]] the second electrode has ~~having~~ a same shape as the first electrode, the second electrode being disposed separate from the first electrode such that an opening of the second electrode faces an opening of the first electrode;

~~wherein the measurement electrodes are disposed in an inner space defined between the first and second electrodes.~~

36. (Currently Amended) The impedance measurement electrode as claimed in claim [[35]] 61, wherein the measurement electrodes are disposed perpendicular to the first and second electrodes.

37. (Currently Amended- Withdrawn) The impedance measurement electrode as claimed in claim [[28]] 67, wherein ~~each of the measurement electrodes comprises:~~

~~a~~ the third electrode has ~~having~~ an oval structure with an opening portion and a predetermined curvature; and

a fourth electrode has ~~having~~ a same shape as the third electrode, the fourth electrode being disposed separate from the third electrode such that an opening of the fourth electrode faces an opening of the third electrode;

~~wherein the third and fourth electrodes are disposed between the plurality of current supply electrodes.~~

38. (Currently Amended) The impedance measurement electrode as claimed in claim [[37]] 65, wherein the third and fourth electrodes are disposed perpendicular to the plurality of current supply electrodes.

39. (Currently Amended) The impedance measurement electrode as claimed in claim [[31]] 65, wherein a normal line of ~~the opening~~ an open portion of each current supply electrode is perpendicular to a normal line of ~~the opening~~ an open portion of each measurement electrode.

40. (Currently Amended) The impedance measurement electrode as claimed in claim [[33]] 66, wherein a normal line of ~~the opening~~ an open portion of each current supply electrode is perpendicular to a normal line of ~~the opening~~ an open portion of each measurement electrode.

41. (Currently Amended) The impedance measurement electrode as claimed in claim [[31]] 28, further comprising:

a first an electrode distance adjuster for adjusting at least one of a distance between the current supply electrodes ~~including:~~

~~a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and~~

a second electrode distance adjuster for adjusting a distance between the measurement electrodes ~~including:~~

~~the second electrode distance adjuster includes a second stationary screw line connected to the measurement electrodes, a second rotary screw joined to the second stationary screw line and rotating the second stationary screw line to move the measurement electrodes along the second stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the second stationary screw line, wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.~~

42. (Currently Amended) The impedance measurement electrode as claimed in claim [[33]] 41, wherein the electrode distance adjuster further comprises ~~comprising:~~

a first electrode distance adjuster for adjusting a distance between the current supply electrodes including:

a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and

~~a second electrode distance adjuster for adjusting a distance between the measurement electrodes including:~~

~~the second electrode distance adjuster includes a second stationary screw line connected to the measurement electrodes, a second rotary screw joined to the second stationary screw line and rotating the second stationary screw line to move the measurement electrodes along the second stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the second stationary screw line, wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.~~

43. (Currently Amended) The impedance measurement electrode as claimed in claim [[35]] 42, wherein the electrode distance adjuster further comprises ~~comprising~~:

~~a first electrode distance adjuster for adjusting a distance between the current supply electrodes including:~~

~~a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and~~

~~a second electrode distance adjuster for adjusting a distance between the measurement electrodes including:~~

~~the second electrode distance adjuster includes a second stationary screw line connected to the measurement electrodes, a second rotary screw joined to the second stationary screw line and rotating the second stationary screw line to move the~~

measurement electrodes along the second stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the second stationary screw line, wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.

44. (Currently Amended) The impedance measurement electrode of claim [[37]] 41, wherein the electrode distance adjuster further comprises comprising:

~~a first electrode distance adjuster for adjusting a distance between the current supply electrodes including:~~

~~a first stationary screw line connected to the current supply electrodes, a first rotary screw joined to the first stationary screw line and rotating the first stationary screw line to move the current supply electrodes along the first stationary screw line, and a fixing stud for fixing each of the current supply electrodes to the first stationary screw line; and~~

a second electrode distance adjuster for adjusting a distance between the measurement electrodes including:

~~the second electrode distance adjuster includes a second stationary screw line connected to the measurement electrodes, a second rotary screw joined to the second stationary screw line and rotating the second stationary screw line to move the measurement electrodes along the second stationary screw line, and a fixing stud for fixing each of the measurement electrodes to the second stationary screw line; wherein the first stationary screw line and the second stationary screw line are separated from each other by a predetermined distance and are perpendicular to each other.~~

45. (Currently Amended) The impedance measurement electrode as claimed in claim [[30]] 28, wherein a distance between the measurement electrodes is less than about 5 mm.

46.-49. (Canceled).

50. (Currently Amended-Withdrawn) The impedance measurement electrode as claimed in claim [[28]] 62, wherein the current supply electrodes and the measurement electrodes ~~comprise flat structure electrodes~~ are linear and disposed in parallel, ~~and the measurement electrodes are disposed between the current supply electrodes.~~

51. (Currently Amended) The impedance measurement electrode as claimed in claim [[50]] 28, further comprising:

a stationary screw line connected to the current supply electrodes and the measurement electrodes;

a rotary screw, which is joined to the stationary screw line, for rotating the stationary screw line to move the current supply electrodes and the measurement electrodes along the stationary screw line; and

a fixing stud for fixing each of the current supply electrodes and the measurement electrodes to the stationary screw line.

52. (Canceled).

53. (New) The impedance measurement system as claimed in claim 1, wherein the measuring electrodes are disposed between the current supply electrodes.

54. (New) The impedance measurement system as claimed in claim 53, wherein the plurality of current supply electrodes comprises a first electrode and a second electrode, opposite the first electrode, and wherein the plurality of measurement electrodes are in a space defined between the first and second electrodes.

55. (New) The impedance measurement system as claimed in claim 54, wherein at least one of the first electrode, the second electrode and the plurality of measurement electrodes has an open two dimensional shape.

56. (New) The impedance measurement system as claimed in claim 55, wherein the first and second electrodes have complementary open two dimensional shapes.

57. (New) The impedance measurement system as claimed in claim 56, wherein the plurality of measurement electrodes comprise third and fourth electrodes having complementary open two dimensional shapes.

58. (New) The impedance measurement system as claimed in claim 57, wherein the first, second, third and fourth electrodes have a same open two dimensional shape.

59. (New) The impedance measurement system as claimed in claim 55, wherein the plurality of measurement electrodes comprise third and fourth electrodes having complementary open two dimensional shapes.

60. (New) The impedance measurement system as claimed in claim 1, further comprising a signal processing unit, which is connected to the measurement electrodes, for receiving response signals generated in the skin in response to the applied constant current, for generating a potential difference signal, for removing noise from the potential difference signal, and for amplifying the noise-removed potential difference signal.

61. (New) The impedance measurement electrode as claimed in claim 28, wherein the measuring electrodes are disposed between the current supply electrodes.

62. (New) The impedance measurement electrode as claimed in claim 61, wherein the plurality of current supply electrodes comprises a first electrode and a second electrode, opposite the first electrode, and wherein the plurality of measurement electrodes are in a space defined between the first and second electrodes.

63. (New) The impedance measurement electrode as claimed in claim 62, wherein at least one of the first electrode, the second electrode and the plurality of measurement electrodes has an open two dimensional shape.

64. (New) The impedance measurement electrode as claimed in claim 63, wherein the first and second electrodes have complementary open two dimensional shapes.

65. (New) The impedance measurement electrode as claimed in claim 64, wherein the plurality of measurement electrodes comprise third and fourth electrodes having complementary open two dimensional shapes.

66. (New) The impedance measurement electrode as claimed in claim 65, wherein the first, second, third and fourth electrodes have a same open two dimensional shape.

67. (New) The impedance measurement electrode as claimed in claim 63, wherein the plurality of measurement electrodes comprise third and fourth electrodes having complementary open two dimensional shapes.